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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,506	08/07/2003	Toshikazu Mizukoshi	OKI 361	8477

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EXAMINER	
CHEN, JACK S J	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/635,506	MIZUKOSHI, TOSHIKAZU	
	Examiner	Art Unit	
	Jack Chen	2813	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) *2 and 3* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/7/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

In response to the communication filed on April 19, 2004, claims 1-9 are active in this application.

Claims 2-3 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse dated on April 19, 2004.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement filed on August 7, 2003 has been considered.

Oath/Declaration

Oath/Declaration filed on August 7, 2003 has been considered.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

2. The abstract of the disclosure is objected to because the reference characters should be in parentheses. Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Claim 1 is objected to because of the following informalities: page 20, line 3, the phrase "element isolating portion;" should change to –element isolating portion. --. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Park et al., U.S./6,331,469 B1.

Park et al. teaches a method for forming a semiconductor device, which comprises a mask forming step comprised of sequentially forming a first insulating film 42 and a second insulating film 44 on a semiconductor substrate 40 (fig. 5A), followed by forming a mask 46 for forming trenches on the second insulating film by patterning so as to expose a surface area of the

second insulating film corresponding to each trench formed on the semiconductor substrate (fig. 5A); a trench forming step comprised of etching a portion extending from the surface area of the exposed second insulating film to an in-depth part of the semiconductor substrate using the mask for forming trenches 47 (fig. 5B; col. 5, lines 39-51), thereby forming the trenches on the semiconductor substrate; a depositing step comprised of removing the mask for forming trenches, followed by depositing a third insulating film 52 by filling a third insulating film into each trench up to the height to cover the second insulating film (fig. 5D); a second oxide film 54 forming step comprised of subjecting the semiconductor substrate at a cornered portion of each trench to thermal oxidation after the depositing step, thereby forming a second oxide film (fig. 5F); a planarizing step comprises of polishing and planarizing the third insulating film so as to expose the second insulating film (fig. 5D); and an element isolation portion forming step comprised of removing the second insulating film and the first insulating film, followed by etching the third insulating film such that a part of the third insulating film remains inside each trench, thereby forming element isolating portion 52 (fig. 5E), see figs. 1-10; cols. 1-12 for more details.

Re claim 4, wherein the first insulating film is silicon oxide 42 and the second insulating film is a silicon nitride film 44.

6. Claims 1, 4-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al., U.S./6,500,726 B2.

Lee et al. teaches a method for forming a semiconductor device, which comprises a mask forming step comprised of sequentially forming a first insulating film 31 and a second insulating

film 33 on a semiconductor substrate 30 (fig. 8), followed by forming a mask for forming trenches on the second insulating film by patterning so as to expose a surface area of the second insulating film corresponding to each trench formed on the semiconductor substrate (fig. 8; col. 6, lines 7-28); a trench forming step comprised of etching a portion extending from the surface area of the exposed second insulating film to an in-depth part of the semiconductor substrate using the mask for forming trenches (fig. 8; col. 6, lines 7-28), thereby forming the trenches (regarding the plural trenches, see col. 3, lines 10-25) on the semiconductor substrate; a depositing step comprised of removing the mask for forming trenches, followed by depositing a third insulating film 41 by filling a third insulating film into each trench up to the height to cover the second insulating film (fig. 11; col. 7, lines 5-18); a second oxide film 51 forming step comprised of subjecting the semiconductor substrate at a cornered portion of each trench to thermal oxidation after the depositing step, thereby forming a second oxide film (fig. 14); a planarizing step comprises of polishing and planarizing the third insulating film so as to expose the second insulating film (fig. 11); and an element isolation portion forming step comprised of removing the second insulating film and the first insulating film, followed by etching the third insulating film such that a part of the third insulating film remains inside each trench, thereby forming element isolating portion (fig. 13); see figs. 1-15; cols. 1-10 for more details.

Re claim 4, wherein the first insulating film is silicon oxide 31 and the second insulating film is a silicon nitride film 33.

Re claims 5-6, wherein the third insulating film is a silicon oxide film 41.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al., U.S./6,331,469 B1 in view of Watanabe, U.S./6,417,073 B2.

Park et al. disclosed above (see paragraph 5); however, Park et al. is silent to using HDP-CVD method for forming silicon oxide.

Watanabe teaches a method for filling the trench with silicon oxide 311 (fig. 7A; col. 1, lines 40-45) by using HDP-CVD method.

Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to use HDP-CVD silicon oxide as taught by Watanabe in the method of Park et al. in order to provide good isolation, excellent uniformity, conformal step coverage, large wafer capacity and high throughput.

9. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., U.S./6,500,726 B2 in view of Watanabe, U.S./6,417,073 B2.

Lee et al. disclosed above (see paragraph 6); however, Lee et al. is silent to using HDP-CVD method for forming silicon oxide.

Watanabe teaches a method for filling the trench with silicon oxide 311 (fig. 7A; col. 1, lines 40-45) by using HDP-CVD method.

Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to use HDP-CVD silicon oxide as taught by Watanabe in the method of Lee et al. in order to provide good isolation, excellent uniformity, conformal step coverage, large wafer capacity and high throughput.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Chen whose telephone number is (571)272-1689. The examiner can normally be reached on Monday-Friday (9:00am-6:30pm) alternate Monday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead can be reached on (571)272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jack Chen
Primary Examiner
Art Unit 2813